U.S. House of Representatives
Committee on Natural Resources
Washington, DC 20515

May 13, 2011

The Honorable Greg Jaczko
Chairman
Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Chairman Jaczko:

I write to request information related to a recent apparent accidental criticality event that occurred on May 10, 2011 at the Pilgrim Nuclear Power plant, which is located 38 miles from Boston. Additionally, and in light of this apparent safety-related incident, I request your assistance in obtaining information regarding the analysis that the Nuclear Regulatory Commission (NRC) has historically required licensees to provide under the National Environmental Policy Act (NEPA) prior to the issuance of a license to operate or extend the license for the operation of a nuclear power plant.

I am concerned that these NEPA requirements have failed to include a realistic assessment of the potential consequences of more serious accidents or attacks. I am also concerned that the Commission has granted license extensions for four nuclear reactors since the Fukushima meltdown without requiring licensees to comply with the requirements of NEPA that any "new and significant" information regarding the environmental consequences of operating the nuclear reactor be included in the application. I further urge the Commission to immediately suspend action on all pending licensing decisions until the full range of safety lessons and environmental consequences associated with the Fukushima meltdown are fully understood and properly applied to U.S. nuclear power plants, and that NEPA's requirements for the inclusion of any new and significant information are fully complied with.

On May 10, 2011[1], the Pilgrim nuclear power plant "scrammed," meaning that it underwent an emergency shutdown to stop nuclear fission from proceeding. This evidently occurred as operators withdrew the control rods from the reactor core and the neutron and power levels began to unexpectedly increase quickly, causing the system to shut itself down to stop the chain reaction. According to NRC staff, a special investigative team will be sent to the Pilgrim nuclear power plant on May 16. While no

[1] See NRC Event Number 46837

environmental consequences occurred as a result of this event, it nevertheless highlights the fragility of our nuclear power plants and the need to ensure that the highest possible safety standards are required and maintained.

As you know, on January 27, 2006, Entergy filed an application to relicense Pilgrim for an additional twenty years after its original operating license expires in 2012. Since the NEPA requires a consideration of the potential environmental impacts of proposed regulatory decisions, NRC requires licensees to submit an "Environmental Report" as part of their relicensing applications, and these reports[2] must include "any new and significant information regarding the environmental impacts of license renewal of which the applicant is aware."

The Fukushima meltdown clearly has revealed "new and significant information" related to the potential environmental impacts associated with catastrophic accidents or attacks on nuclear power plants, as detailed by a list of events that have occurred there in Appendix A. Just yesterday, it was announced that a second reactor at the Fukushima Daiichi power plant[3] (Unit 1) may have experienced a core meltdown that resulted in nuclear fuel rods melting holes[4] in the bottom of a 16 cm thick reactor pressure vessel and enabling the release of nuclear materials.

There have additionally been numerous reports regarding regulatory loopholes in NRC regulations and oversight. For example, yesterday I released a report[5] that described several key findings regarding specific absences of regulatory requirements for reactor cores and spent nuclear fuel pools that could, if present, prevent or mitigate against the sort of catastrophic radiation releases that occurred in Japan. A list of these principal findings is included in Appendix B. Moreover, just yesterday, the NRC announced[6] that its early inspections at U.S. nuclear power plants identified vulnerabilities associated with emergency equipment that would not have operated had there been an accident.

It is clear that the environmental consequences of Fukushima will be "new and significant" compared to those that had been previously contemplated, and that an assessment of NRC's safety regulations will also reveal "new and significant" vulnerabilities when viewed through the post-Japan lens. Yet these consequences and vulnerabilities were not even fully understood, let alone factored into any of the Commission's post-Fukushima decisions to grant license extensions for four nuclear reactors by way of a revised or supplemental Environmental Impact Statement or by way of new safety requirements[7].

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[2] See http://www.nrc.gov/reactors/operating/licensing/renewal/applications/pilgrim/environ-report.pdf for Entergy's Environmental Report which also summarizes these requirements.
[3] Speculation that a melt-through at Unit 2 happened occurred several weeks ago, please see http://markey.house.gov/docs/4-6-11.markey_e-mail_1_-_nrc_question_regarding_fukushima_unit_2.pdf
[4] http://www.reuters.com/article/2011/05/12/us-japan-nuclear-reactor-idUSTRE74B1H520110512
[5] http://markey.house.gov/docs/05-12-11reportfinalsmall.pdf
[6] http://www.nytimes.com/2011/05/13/business/energy-environment/13nuke.html?ref=asia
[7] The NRC granted license extension to Vermont Yankee on March 21, 2011, and to Palo Verde Units 1, 2, and 3 on April 21, 2011. http://www.nrc.gov/reactors/operating/licensing/renewal/applications.html

I have also learned that the underlying methodology that nuclear reactor licensees must undertake when complying with NEPA is highly inadequate. For example, the NRC allows licensees to utilize analytical software called "MELCOR Accident Consequence Code Systems" (MACCS2)[8] to estimate the likely costs associated with a cleanup following a catastrophic accident at or attack on a nuclear power plant. This code is limited[9] in fundamental ways because it limits the total duration of a radioactive release to no more than either i) four days, if the licensee chooses to model the release of one radioactive plume per day for four days or ii) a single plume having a total duration of the maximum-allowed 24 hours. This limitation borders on the absurd in light of the duration of ongoing releases from the Fukushima Daiichi reactors and spent fuel pools, and some variation of these limitations on radiation release duration reportedly exist in every known reactor accident code system.

In light of the seriousness and extent of the radiation releases that continue to be emitted from the Fukishima Daiichi nuclear power plant and the need to ensure that we make the necessary safety upgrades to maintain the highest levels of safety at U.S. nuclear power plants, I request your assistance in responding to the following questions and requests for information:

1) Please fully describe the circumstances that led to the emergency shutdown at the Pilgrim nuclear power plant, and the results of your investigation thereof.

2) For each of the last ten years, please provide me with a list of each "scram" that has occurred in the United States, including the name and location of the reactor, the date of the event, the cause of the scram, whether or not the NRC investigated the events, and if so, what the outcome of the investigation was (including any enforcement actions taken).

3) Does the Commission concur that the events in Japan represent "new and significant" information regarding the potential duration, extent and circumstances of radiation releases that could accompany a catastrophic accident at or attack on a nuclear power plant? If not, why not, especially in light of the list of circumstances that have taken place in Japan that is included in Appendix A?

4) Will the NRC require licensees to amend their Environmental Reports for all pending license or re-license applications in light of the requirements of NEPA to include any "new and significant" information regarding the environmental consequences of their proposed activities? If not, why not, and how can the Commission conclude that the absence of a requirement to do so is consistent with the legal requirements of NEPA?

5) Will the NRC require the development or utilization of new software that is capable of modeling the duration and extent of the radiation releases that have been experienced at Fukushima as part of its requirements for licensees to comply

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[8] http://www.hss.doe.gov/nuclearsafety/qa/sqa/central_registry/MACCS2/maccs2.htm

[9] See Pilgrim Watch request for hearing on post-Fukushima SAMA contention filed May 2011 in Docket # 50-293-LR for a full discussion and references to source documents

with NEPA and/or other Commission-mandated analysis? If not why not, since the software used is apparently unable to provide realistic information?

Thank you very much for your prompt attention to this important matter. Please provide your response no later than close of business on Friday June 3, 2011. If you have any questions or concerns, please have your staff contact Dr. Michal Freedhoff of the Natural Resources Democratic Staff at 202-225-2836.

Sincerely,

Edward J. Markey

Edward J. Markey
Ranking Democrat
House Natural Resources Committee

Appendix A: Challenges Faced During the Fukushima Meltdown that could constitute "new and significant information" related to the operation of nuclear power plants under the National Environmental Policy Act

i) An earthquake that was more severe than the one the nuclear power plant was designed to withstand.
ii) A tsunami that was more severe than the one the nuclear power plant was designed to withstand.
iii) A loss of operating power that was longer than current regulations are required to address.
iv) A total station blackout (i.e. loss of operating power and failure of emergency diesel generators) that was longer than current regulations are required to address.
v) A hydrogen explosion that occurred due to the buildup of hydrogen in the core or other areas of a nuclear reactor due to the failure of mitigation technologies such as hardened vents or hydrogen re-combiners, and the fact that these mitigation technologies may have failed in the first place.
vi) A hydrogen explosion that occurred due to the buildup of hydrogen in the spent fuel storage area of a nuclear reactor due to the absence of mitigation technologies such as hardened vents or hydrogen re-combiners.
vii) A breach in the containment vessel of a nuclear reactor core caused by a hydrogen explosion.
viii) A breach in the structure of a spent nuclear fuel storage area due to an earthquake or hydrogen explosion.
ix) The failure of the recirculation pump seals within the reactor pressure vessel which may have prevented cooling water from fully filling the pressure vessel and thus covering and cooling the nuclear fuel rods contained therein.
x) The failure of one or more safety relief valves within the primary containment area that could have enabled the transfer of radioactive core material between the drywell and the torus.
xi) The melting of core material through the pressure vessel and into the drywell or torus of the nuclear reactor(s).
xii) The failure of the isolation condenser and/or reactor core isolation cooling systems and subsequent inability to provide cooling function to the nuclear reactor cores.
xiii) The failure of the primary containment vessel spray cooling and core spray systems.
xiv) The failure of systems used to cool spent nuclear fuel storage areas, including areas that contained varying amounts of spent nuclear fuel of varying ages.
xv) The failure of diagnostic equipment to accurately monitor temperature, water levels, hydrogen/oxygen concentrations, pressures and radiation onsite, both during a total station blackout and after basic electricity function is restored (such as if the devices have been damaged by water, radiation or other events).
xvi) The absence of a source of fresh cooling water with which to cool the reactor core and spent nuclear fuel storage areas.

xvii) The absence of a means by which to store large quantities of highly radioactive water that has leaked or spilled after being used to cool the core and spent nuclear fuel storage areas.

xviii) Repeated earthquake aftershocks that further threatened the integrity of the already-compromised reactor core, spent nuclear fuel storage areas, and emergency operations.

xix) The absence (or highly limited presence) of an ability to manually repair or restore function associated with any of the above failures or events when faced with extremely high levels of radiation that may threaten the health and safety of those both on and offsite.

Appendix B: List of Principal Findings from "Fukushima Fallout"

- The failure of the emergency diesel generators following the loss of off-site electricity led to the meltdowns at the Fukushima reactors. Despite decades of reported problems and NRC warnings, a review of NRC documents conducted by the staff of Congressman Edward J. Markey indicates that there have been recurrent and prolonged malfunctions of emergency diesel generators at nuclear power plants in the U.S. In the past eight years there have been at least 69 reports of emergency diesel generator inoperability at 33 nuclear power plants. A total of 48 reactors were affected including 19 failures lasting over two weeks and 6 that lasted longer than a month.

- There never have been any requirements in the U.S. for spent fuel pools to include technologies to prevent the same kind of hydrogen explosions that reportedly occurred at spent nuclear fuel pools in Fukushima. Alarmingly, NRC's regulations do not require emergency diesel generators to be operational at times when there is no fuel in the reactor core, even though this could leave spent nuclear fuel pools without any backup cooling systems in the event of a loss of external electricity to the power plant. Finally, NRC has not required its licensees to reduce the amount of nuclear fuel stored in its spent nuclear fuel pools by moving it to dry cask storage, a safer means of storage that would reduce the risk of fire and radiation release in the event of an accident.

- NRC has removed its regulatory requirements for reactor containments to include technologies to prevent hydrogen explosions, even as NRC officials repeatedly and inaccurately asserted that such technologies were absent in Japan but are required in the U.S.

- The NRC has not factored modern geologic information into seismic safety requirements for nuclear power plants, and has not incorporated its technical staff's recommendation to do so even though the new information indicates a much higher probability of core damage caused by an earthquake than previously believed. In fact, the NRC has continued to process applications for license extensions for many nuclear reactors, including Pilgrim (which is approximately 38 miles from Boston) and Indian Point (which is approximately 25 miles from New York City), even in the absence of upgraded seismic safety requirements.

- NRC's post-Fukushima inspections in the U.S. appear to be limited in scope, and its U.S. nuclear reactor inspection reports will likely exclude vulnerabilities from both the NRC and the public due to limitations imposed by the NRC.